Your name

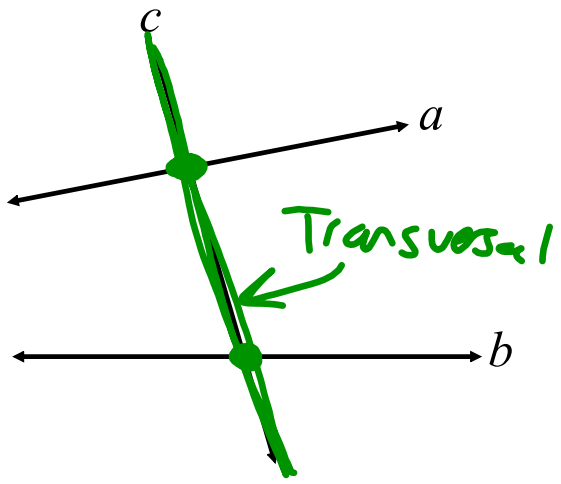
Mrs. Theo

/ /

Notes

Angles Created by Parallel Lines and Transversals

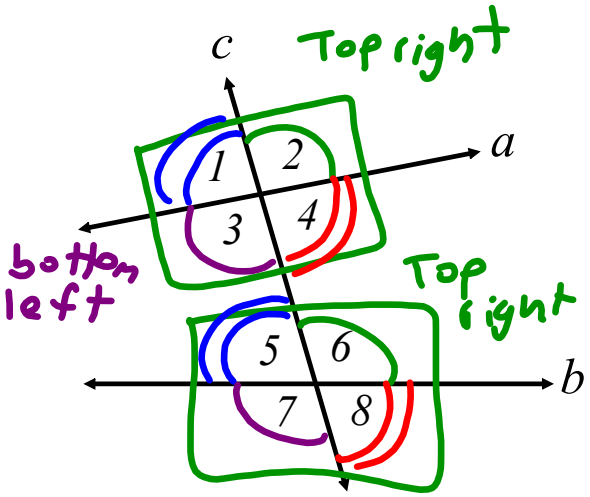
Transversal = A line that intersects two or more coplanar lines at different points.



Line c is a transversal intersecting lines a and b.

Corresponding Angles

Angles that are located in corresponding positions.



Top right

Same Position different Place

bottom left

Top right

∠2 and ∠6

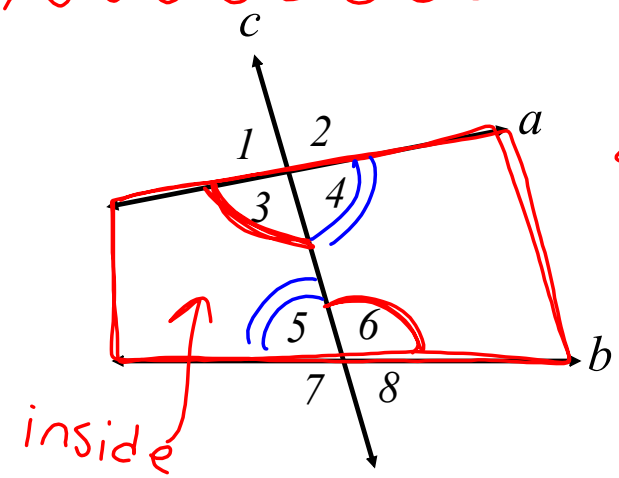
∠1 and ∠5

∠3 and ∠7

∠4 and ∠8

Alternate Interior Angles

Angles that are located inside the two lines ***a*** and ***b*** but on opposite sides of the transversal ***c***.



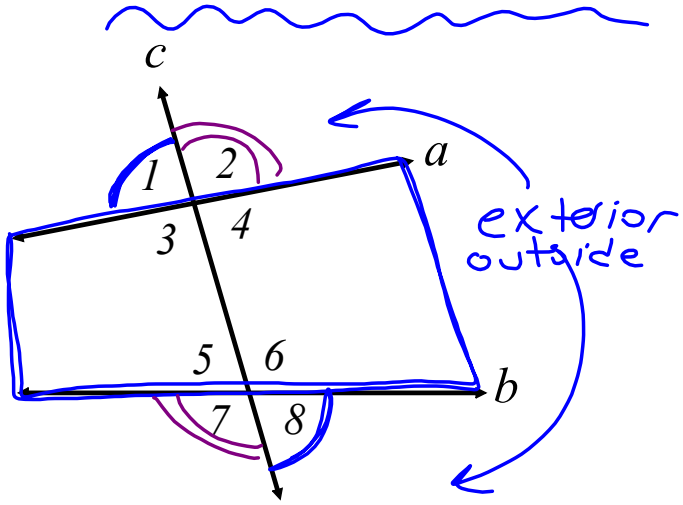
inside

∠3 and ∠6

∠4 and ∠5

Alternate Exterior Angles

Angles that are located outside the two lines ***a*** and ***b*** but on opposite sides of the transversal ***c***.

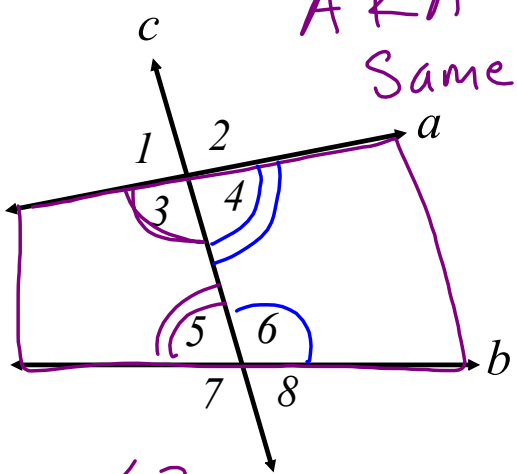


∠1 and ∠8
∠2 and ∠7

Consecutive Interior Angles

Angles that are located inside the two lines ***a*** and ***b*** but on the same side of the transversal ***c***.

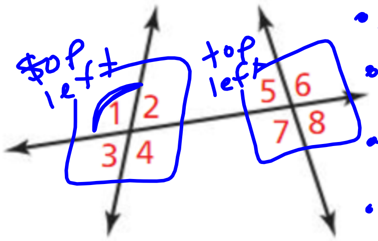
AKA
Same Side Interior



∠3 and ∠5
∠6 and ∠4

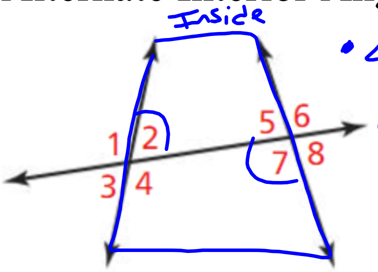
Corresponding Angle Pairs are:

• ∠1 and ∠5

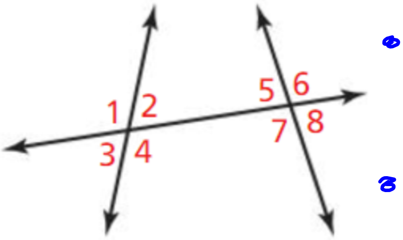


Alternate Interior Angle Pairs are:

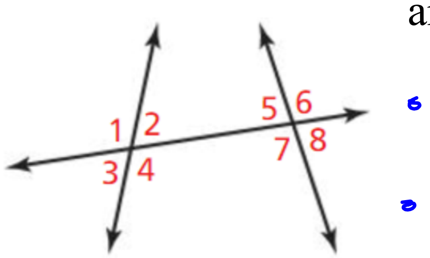
• ∠2 and ∠7



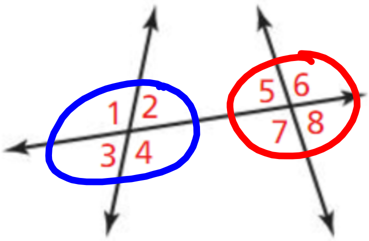
Alternate Exterior Angle Pairs are:



Consecutive Interior Angle Pairs are:

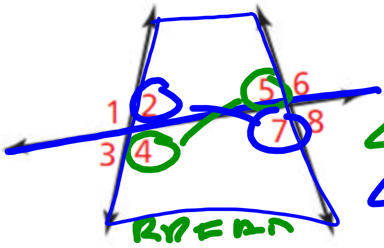


Corresponding = SAME LOCATION DIFF. POD



∠1 + ∠5
∠2 + ∠6
∠3 + ∠7
∠4 + ∠8

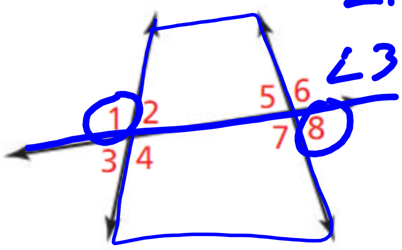
Alternate Interior



∠4 + ∠5
∠2 + ∠7

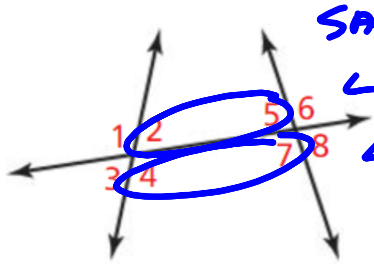
Alternate Exterior

∠1 + ∠8
∠3 + ∠6



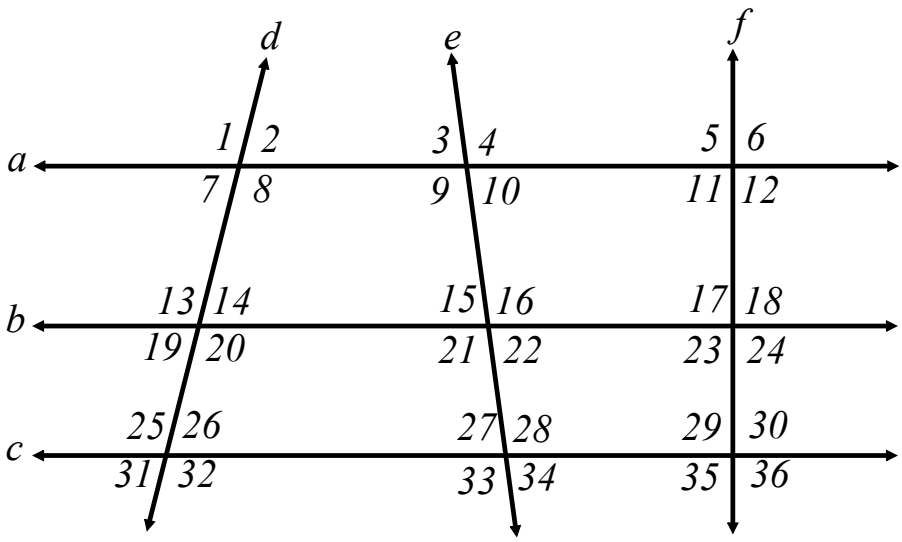
Consecutive Interior SSI

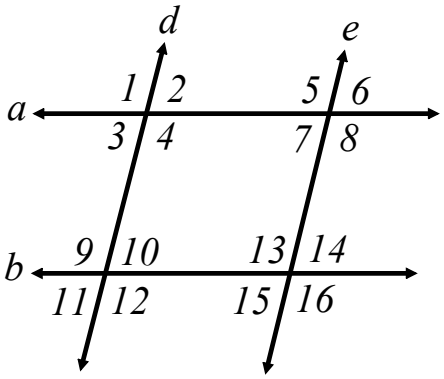
SAME SIDE INTERIOR
∠2 + ∠5
∠4 + ∠7

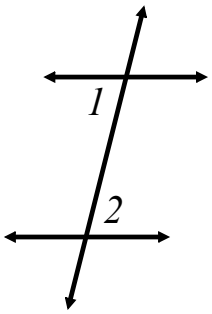


x SSE = SAME SIDE EXTERIOR

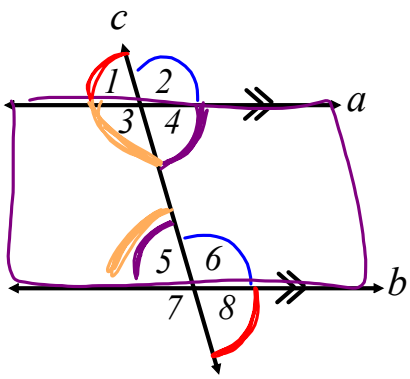
Given 2 angles, name the transversal and classify them as either: Corresponding, AIA, AEA, CIA, or none.







For Parallel Lines ONLY



Corresponding Angles = Angles that are located in corresponding positions.

ARE EQUAL $m\angle 2 = m\angle 6$

Alternate Interior Angles = Angles that are located inside the two lines ***a*** and ***b*** but on opposite sides of the transversal ***c***.

ARE EQUAL $m\angle 4 = m\angle 5$

Alternate Exterior Angles = Angles that are located outside the two lines ***a*** and ***b*** but on opposite sides of the transversal ***c***.

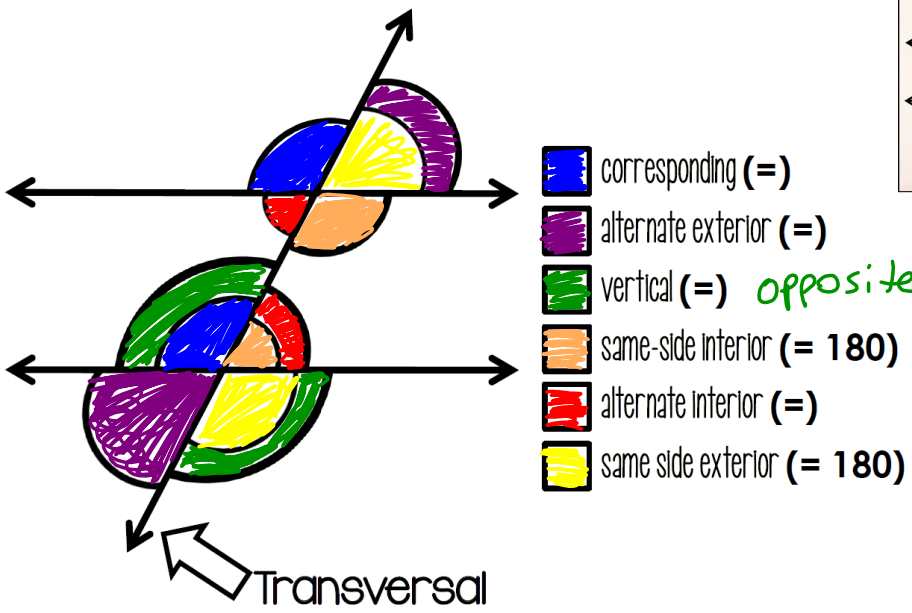
ARE EQUAL $m\angle 1 = m\angle 8$

Consecutive Interior Angles = Angles that are located inside the two lines ***a*** and ***b*** but on the same side of the transversal ***c***.

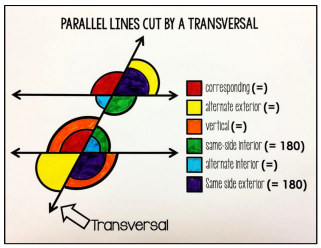
ARE SUPPLEMENTARY
THEY ADD UP TO 180°

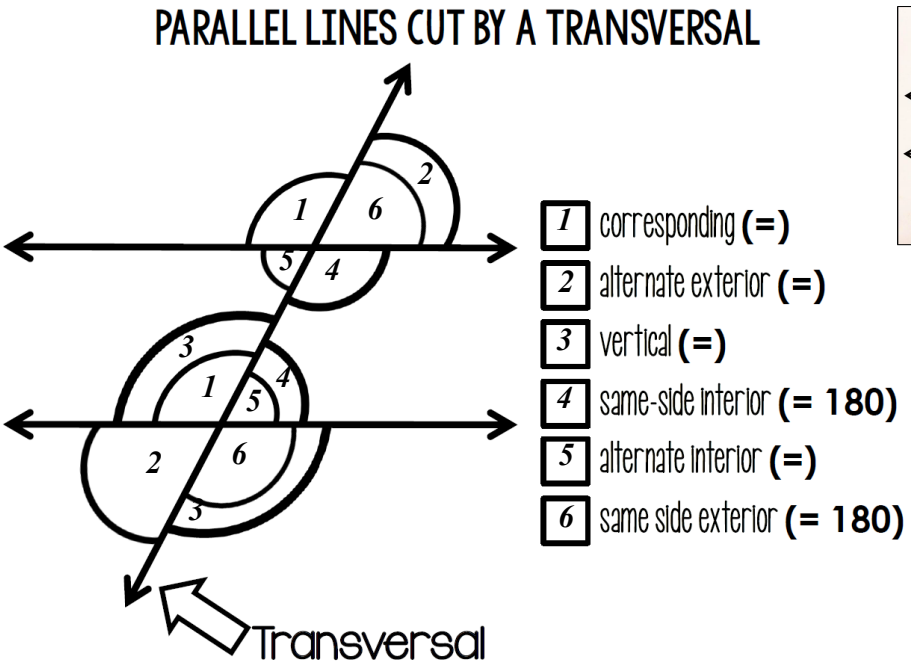
$m\angle 3 + m\angle 5 = 180$

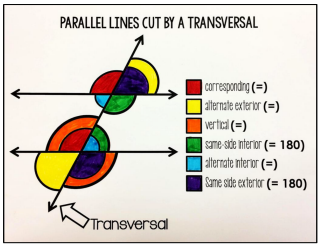
PARALLEL LINES CUT BY A TRANSVERSAL

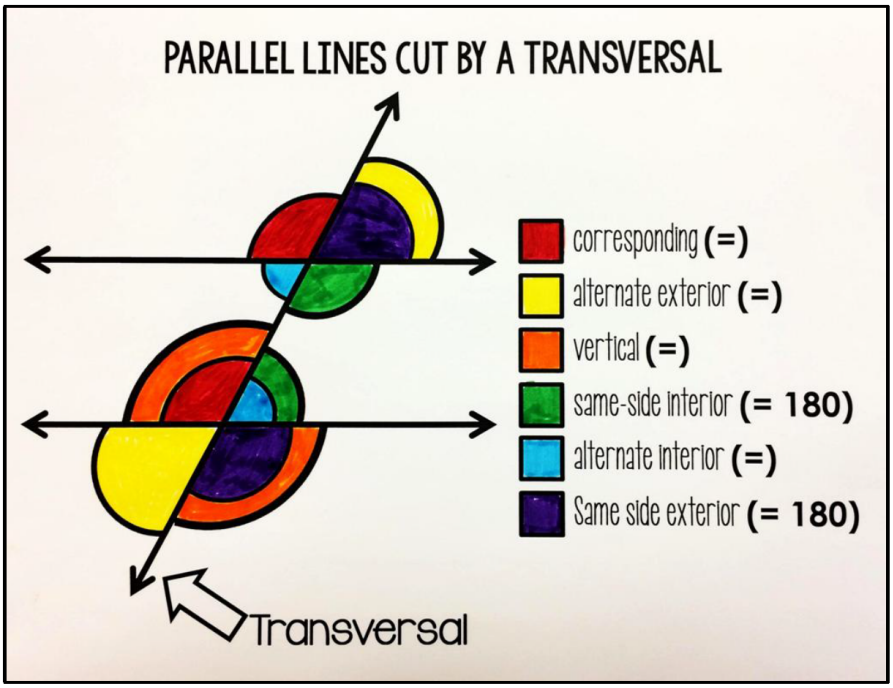


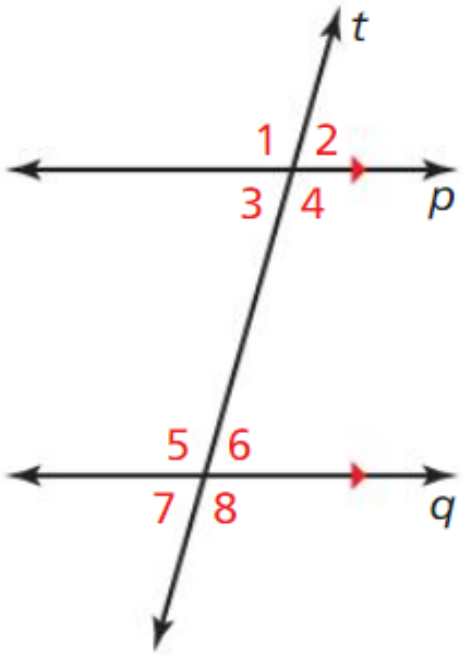
opposite ∠s




PARALLEL LINES CUT BY A TRANSVERSAL
1 6 2
5 4
3 1 4 5
2 6 3
Transversal
1 corresponding (=)
2 alternate exterior (=)
3 vertical (=)
4 same-side interior (= 180)
5 alternate interior (=)
6 same side exterior (= 180)

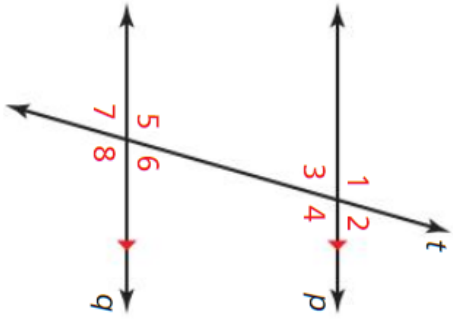

PARALLEL LINES CUT BY A TRANSVERSAL
corresponding (=)
alternate exterior (=)
vertical (=)
same-side interior (= 180)
alternate interior (=)
Same side exterior (= 180)
Transversal


PARALLEL LINES CUT BY A TRANSVERSAL
corresponding (=)
alternate exterior (=)
vertical (=)
same-side interior (= 180)
alternate interior (=)
Same side exterior (= 180)
Transversal



Angles Formed By Transversals

Name	Examples	Description	Facts
Corresponding Angles			if lines are // then corresponding angles are equal
Alternate Interior Angles			
Alternate Exterior Angles			
Consecutive Interior Angles			

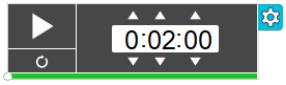


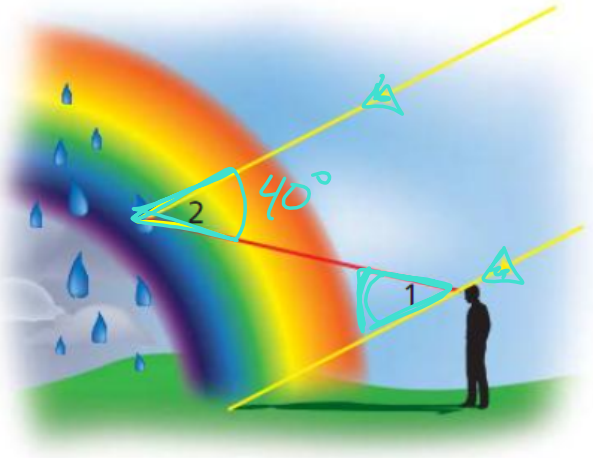
Angles Formed By Transversals

Name	Examples	Description	Facts
Corresponding Angles	$\angle 1$ & $\angle 5$ $\angle 3$ & $\angle 7$ $\angle 2$ & $\angle 6$ $\angle 4$ & $\angle 8$	-Same location, different "pod" -Same side transversal	If lines $\parallel$, then angles $\cong$
Alternate Interior Angles	$\angle 3$ & $\angle 6$ $\angle 4$ & $\angle 5$	-Opposite sides of the transversal -Both angles between the $\parallel$ lines	If lines $\parallel$, then angles $\cong$
Alternate Exterior Angles	$\angle 1$ & $\angle 8$ $\angle 2$ & $\angle 7$	-Opposite sides of the transversal -Both angles outside the $\parallel$ lines	If lines $\parallel$, then angles $\cong$
Consecutive Interior Angles	$\angle 3$ & $\angle 5$ $\angle 4$ & $\angle 6$	-Same side of the transversal -Both angles between the $\parallel$ lines	If lines $\parallel$, then angles supp.

Example #1 Solving a Real-life Problem

When sunlight enters a drop of rain, different colors of light leave the drop at different angles. This process is what makes a rainbow. For violet light, $m\angle 2 = 40°$. What is $m\angle 1$? How do you know?

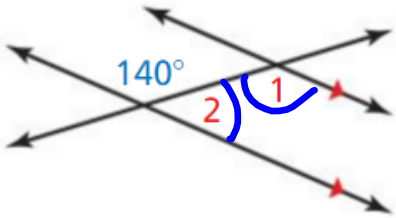




$m\angle 1 = 40°$

In Exercise 6, find $m\angle 1$ and $m\angle 2$. Tell which theorem you use in each case.

6.



$m\angle 1 = 140$ Alt. Int.

$m\angle 2 + m\angle 1 = 180$ Same Side Interior

$m\angle 2 + 140 = 180$

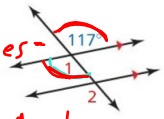
$m\angle 2 = 40°$

3.2 Exercises

Monitoring Progress and Modeling with Mathematics

In Exercises 3–6, find $m\angle 1$ and $m\angle 2$. Tell which theorem you use in each case.

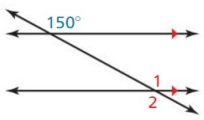
3.



$m\angle 1 = 117°$ Vertical Angles =

$m\angle 2 = 117°$ Alt. Ext. Angle =

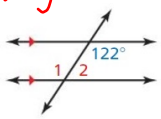
4.



$m\angle 1 = 150°$ Corresponding $\angle$s =

$m\angle 2 = 150°$ Alt. Ext $\angle$s =

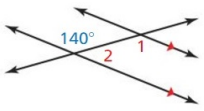
5.



$m\angle 1 = 122°$ Alt. Int $\angle$s =

$m\angle 2 = 78°$ Same Side Interior

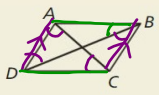
6.



$m\angle 1 = 140°$ Alt. Int. Ang =

$m\angle 2 = 40°$ Linear Pair $140 + m\angle 2 = 180$

14. HOW DO YOU SEE IT?
Use the diagram.



a. Name two pairs of congruent angles when $\overline{AD}$ and $\overline{BC}$ are parallel. Explain your reasoning. $\angle DAC \cong \angle DCA$ Alt. int $\angle ADB \cong \angle DBC$

b. Name two pairs of supplementary angles when $\overline{AB}$ and $\overline{DC}$ are parallel. Explain your reasoning.

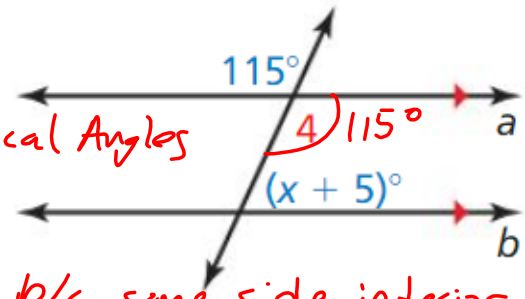
You cannot because you do not have Same side interior or exterior angles

Example #7

Using Properties of Parallel Lines

Find the value of x.

0:03:00



$m\angle 4 = 115°$ b/c Vertical Angles

$x + 5 + 115 = 180$ b/c same side interior

$x + 120 = 180$

$-120 \quad -120$

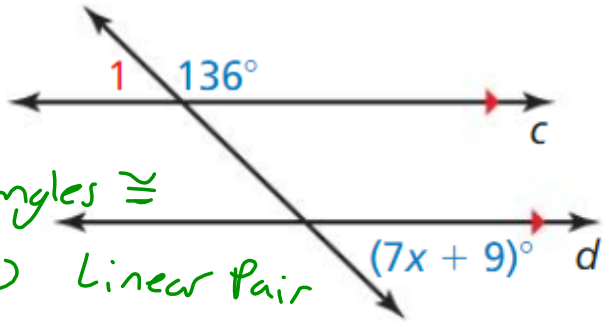
$x = 60$

Example #8

Using Properties of Parallel Lines

Find the value of x.

0:03:00



$m\angle 1 = 7x + 9$

alt. Ext. Angles $\cong$

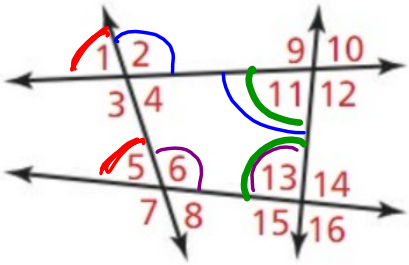
$m\angle 1 + 136 = 180$ Linear Pair

$(7x + 9) + 136 = 180$

$7x + 145 = 180$

$x = 5$

USING STRUCTURE In Exercises 15–18, classify the angle pair as *corresponding*, *alternate interior*, *alternate exterior*, or *consecutive interior* angles.



15. $\angle 5$ and $\angle 1$ corresponding

16. $\angle 11$ and $\angle 13$ Consecutive Same side interior

17. $\angle 6$ and $\angle 13$ Consecutive Same side interior

18. $\angle 2$ and $\angle 11$ Alt. Interior